Zarafshan Wind Farm Livestock Management Framework

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1. INTRODUCTION

1.1. Overview

This document has been prepared by Turnstone Ecology for Wood in relation to the proposed 500 MW Zarafshan Wind Farm development near Zarafshan City, Tamdy District, Navoi, Uzbekistan (the Project). The Project is being developed by Masdar (the Developer) with the Power Purchase Agreement and Investment Agreement signed with the Uzbek Government in June 2020.

The document has been produced to provide clarity and certainty on the feasibility of managing the Project's key biodiversity risks prior to the disclosure of environmental and social documents. The risks identified include, but are not limited to, the potential to locally extirpate certain bird populations and have permanent effects on the viability of the adjacent Important Bird Area (Mount Aktau IBA).

This document details a number of aims and management approaches for livestock, farmers and herders at the Project site. The intention of these is to explore whether those actions will lead to a reduction in risk to sensitive species of bird from the Project. The document also contains details on feasibility of these approaches and how they will be implemented as part of the Biodiversity Management Plan (BMP) during the construction and operational period of the Project. Overall, the outcomes of the livestock management framework must:

a) minimise risk to birds present within the area,
b) not increase the sites attractiveness to sensitive bird species, and
c) minimise adverse impacts to the livelihoods of farmers and herders who use the site

1.2. Background

At present, several species of bird have been identified using the site and surrounding areas which, due to their conservation status and/or their flight characteristics, could be sensitive to the impacts of the proposed Wind Farm. The usage by such species has been year-round and the distribution of observed activity has been across the entire site. Nest scoping surveys have also identified nest sites within and adjacent to the Project Area – with further surveys in the nesting seasons happening in 2022.

Bird surveys through 2020 and into Spring 2021 identified movements of Griffon Vulture, Egyptian Vulture and Cinereous Vulture through the Project Area, with Bearded Vulture flights also recorded but at a lower frequency. Whilst birds flying over site are likely to be actively foraging, the number of birds observed actually feeding on site was low. It is however known that vultures, like the Griffon, do feed on livestock carcasses when the opportunity arises, the Cinereous, Egyptian, and Bearded have a more varied diet spectrum, which may include small live prey, and interviews with herders and farmers completed in December 2021 included questions to help establish how regularly this happens.

In addition, species such as Golden Eagle, Steppe Eagle and Saker Falcon have also been recorded in and around the Project Area.

1.3. Site Visit

A site visit was completed in December 2021 by a team of experts comprising Lenders' representative, Alvaro Camiña, along with Wood's representatives: ecologists Tristan Evans and Simon Parker of Turnstone Ecology and Caleb Gordon of Xenops Environmental, along with Uzbek social specialists Saida Yusupova and Fazlullo Agzamov of Green Business Innovation.

The visit was undertaken to assess the feasibility of any livestock management that may be required, along with the implications of such actions. The aims of the visit were to:

a) Develop an understanding of current livestock management practices on the Project site and surroundings, such as overall areas used for grazing by each herder/household, the proportion of such areas within the site, and seasonal movements;
b) Considering bird activity, investigate potential changes in livestock management in the Project Area that might avoid/minimize livestock attracting priority birds to the site;
c) Assess livestock disposal practices and any slaughterhouses and/or waste dumps in or near the Project site;
d) Consult with herders directly to understand their views on potential exclusion areas/night shelters; and
e) Discuss and document any potential impacts of such measures in relation to economic displacement.

There is an official tip to the northwest of Zarafshan (approximately 10km from site) and also an unofficial waste site approximately 2.6km west of site. The unofficial tip was visited and very little evidence of carcasses was present at the time but it was not possible to see into the official tip to check for carcasses.

1.4. Consultation with Uzbek Society for the Protection of Birds (UzSPB)

During the trip to Uzbekistan several of the Project and Lenders representatives met with the UzSPB at their offices in Tashkent to discuss the Project and give the opportunity to voice any concerns. Those present were:

- Roman Kashkarov, UzSPB (Director)
- Yuliya Mitropolskaya, UzSPB (mammologist, and wife of R. Kashkarov)
- Nodir Azimov, UzSPB (young ornithologist with familiarity with Kyzylkum desert region)
- Caleb Gordon, Xenops Environmental (technical specialist subcontractor representing Masdar – Wood – Turnstone)
- Alvaro Camiña-Cardenal, Independent consultant (technical specialist subcontractor representing Lenders - RINA [Lenders' technical advisor])
- Victoria Filatova, Juru Energy, biology subcontractor providing in-country biological staff and logistical support to Masdar team, and serving as Russian-English translator for the meeting

Brief outcomes from that meeting are as follows –

UzSPB expressed their belief that construction of the Project would cause severe and irreversible damage to the biodiversity, ecological function, and domestic livestock grazing activities that currently exist within the Project area.

They believe that many key sensitive bird and mammal species that currently utilize the Project area would completely and permanently abandon it subsequent to the construction of the wind farm (a permanent displacement effect).

They believe that all shepherds would also abandon the area permanently due to noise and other disturbance from the turbines, thus effectively removing all livestock grazing activity from the Project area.
They believe that some shepherds who abandon the Project area would move their flocks into the Aktau Mountain IBA, adversely impacting the biodiversity of the IBA.

They believe that construction activities, including use of heavy machinery, would cause irreparable damage to the thin, fragile soil surface biological community, thus permanently altering a key ecosystem function that sustains the ecological community of the Project area on which its sensitive species depend.

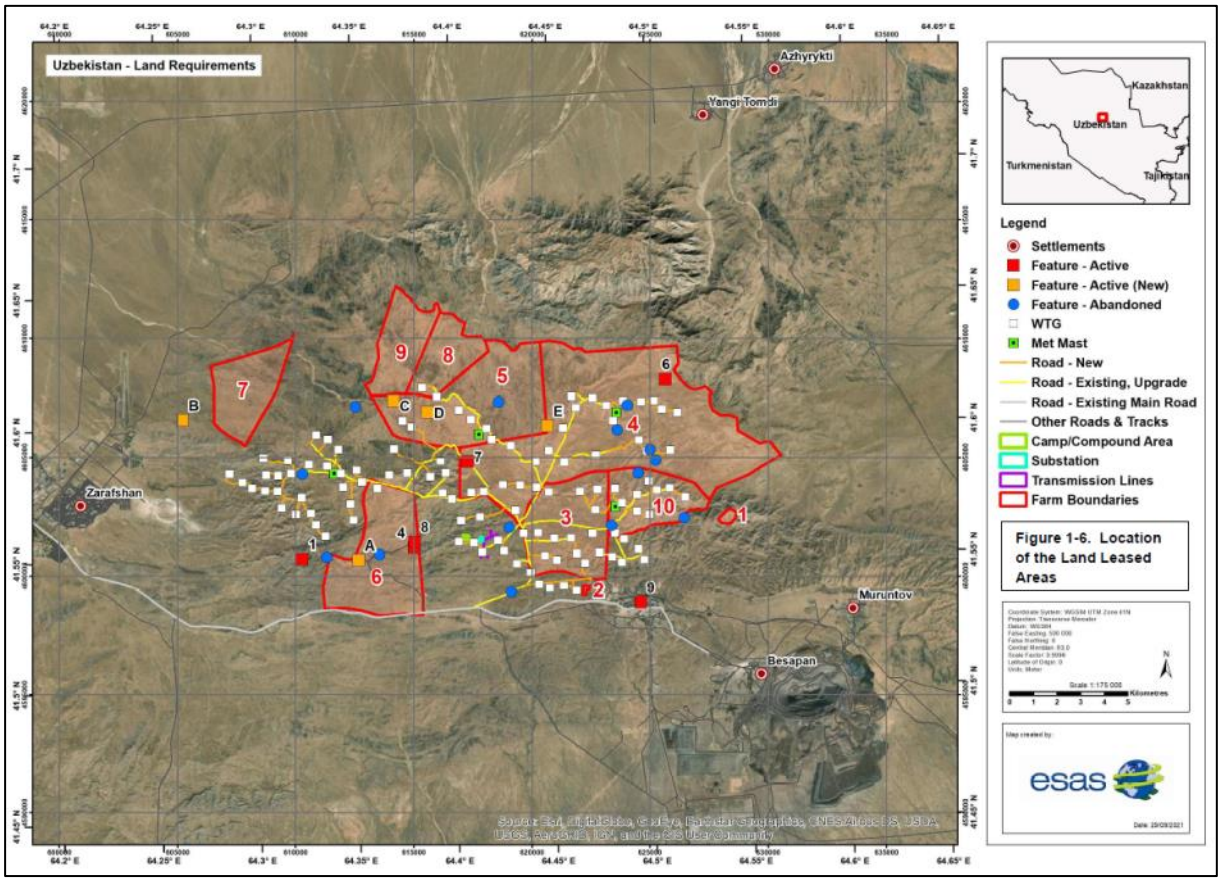
2. *CURRENT LIVESTOCK PRACTICES AND HERDER CONSULTATION*

2.1. Current livestock practices on site

The patterns of land use as ascertained during on site interviews between 2020-21, are included in more detail within the Project Livelihood Restoration Plan[1]. Due to the majority of farmers and herders being away from the site in Winter it was not possible to interview all relevant stakeholders during the December 2021 site visit, they were however interviewed separately at an earlier date.

In summary, ten Leased Area Agreements are active on land within the Project Area and these are held by nine farmers. Of the active lease agreements six relate to land being permanently impacted (*i.e.* with the addition of Project infrastructure) however the levels of land being lost are minor all under 2% of the area) when compared to the amount of land available. Further to this, in the ESIA the impacts of the Project were not perceived to have negative impacts on livelihoods by six of the seven farmers that were interviewed. *Figure 1* shows the distribution of the lease agreements throughout the site.

Figure 1. Leased Area Agreement locations around the Project Area



[1] Environmental and Social Advisory Services (ESAS) Report: Livelihood Restoration Plan (Draft for Disclosure), Zarafshan Wind Farm Project, dated 22 November 2021.

Interviews with local farmers and grazers indicated that seven herders are using the Project Area, either for grazing or access to their leased area. A combination of sheep, goats, cattle and horses graze the land and in total approximately 1700 sheep, 230 goats, 150 cattle and 40 horses are owned by the farmers operating within the land. Each individual herder is responsible for between 100-450 sheep and between 20-110 goats. During the previous interviews only one farmer stated they owned cattle and horses (Plot 6, *Figure 1*), however during the interviews on site in December 2021 a second farmer (Plot 7, *Figure 1*) said he also owns up to 60 horses within the landholding. Small groups of horses were noted around the Project area however it was not clear who owns these. The leaseholder with the largest area of land – plot 4 in *Figure 1* does not graze animals on the project site although during the site visit some livestock were noted within this land area, it was not possible to find out whether they were there on behalf of the leaseholder or if it was a grazer without any formal agreements. *Table 1* shows the number of animals each farmer owns, with the worst-case assumption being that at some point, all these animals may be present on the site.

Table 1. Livestock numbers on site

Lease Number	# of Herders	Sheep	Goats	Cattle	Horses	Seasons
1	2	200	0	0	0	4
2	1	350	0	0	0	4
3+10	0	0	0	0	0	0
4	1	0	0	0	0	0
5	1	450	0	0	0	1
6	1	200	100	150	40	4
7	1	250	20	0	60**	4
8	1	150	0	0	0	1
9	0	100	110	0	0	1
Total	**7***	**1700**	**230**	**150**	**40**	**N/A**

**one herder is shared between plots 5 and 8*

*** not disclosed during the first round of leaseholder interviews*

2.2. Herder Consultation 2021

During the visit the site visit team were able to interview two land lease agreement holders and three herders to find out information about how they used their leased areas, how livestock are managed within those areas at present, average mortality rates of the livestock and whether they were familiar with the vulture and eagle species that have been identified on site. In order to provide an understanding of site use by farmers and their herders, a questionnaire was provided by the Lenders panel which can be found in *Appendix 1* of this document. All questions were asked by the Project's social experts and answers translated. Audio recordings of the conversations were made and the conversations that took place are summarised below. Along with the questionnaire presented by the social specialists, wider discussions were undertaken with the stakeholders by the site visit team to further explore the answers to the questionnaire. Such discussion was again led through translation by the social experts. Notes on the discussions are provided in Appendix 2.

<u>Outcomes of herder consultation</u>

Land lease holder 7 and his herder have livestock out within their leased area throughout the year, with sheep and horses grazing at the time of our interview. The land under this lease is outside the Project Area but is approximately 1.5 km from the nearest turbine location. Of the sheep and goats they own they apparently lose around 7% per year which is comparable with the average mortality rate for sheep elsewhere in the world (*Alvaro Camiña Cardenal pers comm. 2021)*. When asked what happens to sheep when they die whilst away from the corral, we were told that any sheep that die in the field will be buried, alternatively if a sick sheep is present it is taken back to the corral and slaughtered if it becomes too ill. It was estimated that there have been large fatality incidences once in an average 10 years, the most recent of these was due to heavy frosts in spring 2021. Animals that died during this event could not be moved as they became frozen to the ground, this also prevented them being buried quickly. These events occur when a sudden cold front occur in the region after a period of mild climate.

Some doubt was raised by the site team conducting interviews over how regularly sheep from this landholding were buried as the lease holder stated he had seven dead sheep stored at his home in the village and this did not fully correspond with his questionnaire replies.

The land lease holder appeared familiar with Griffon and Cinerous Vultures but considers that "all large birds are eagles". He also said that sometimes they see Egyptian Vultures in spring and summer. One or two months ago, one of his horses died close to the IBA and a group of vultures were observed feeding on this, apparently birds found the carcass in 1-2 hours (although it is not clear how he arrived at this conclusion). He also noted that a group of approximately 12 vultures had been seen feeding on a dead Donkey in his lease area however the exact location of this was not shared.

The herder associated with land lease 7 identified Lammergeier (Bearded Vulture) as a species present on site but was not familiar with Egyptian or Griffon Vultures. He added that they have observed large dark birds taking new-born lambs in springtime.

A single dog is present with the herder during the spring, summer and autumn but not winter, this is fed general food scraps, but these have not been seen to attract vultures. The dog has attacked and killed foxes in the past.

During the interview we were also told that a vulture was observed taking poisoned meat intended for the foxes.

The herder associated with land lease 7 has been present in the area for over 25 years so it is presumed that he has a good knowledge of the area

Land lease holder 5 (although he farms the land in lease area 8) and his Herder were also interviewed during the site visit. The farmer is an extremely experienced retired farmer in his 70's who had grown up in and around the IBA and who had previously been responsible for thousands of animals on farms during the Soviet era (he proudly told us about his trip to Moscow to collect a national award for his farming efforts). We spoke with him in the village before being taken to his corral to see where the animals are kept at night or during lambing. The corral has good walls and a roof to protect the sheep. He has around 300 sheep and estimates that 3-4 lambs are taken by birds each year. After lambing a herder is always with the flock for 1-3 months, with a scarecrow used if the herder cannot be around. Overall, it was estimated that annual mortality of his animals is around 3%, the Farmer attributed this to the high levels of care he and his herders provide and the fact that his corral has walls and a roof.

When asked about his procedure to deal with dead animals we were told that a pit was dug and the animal was burned in the pit. We were also told that they try to dispose of as many of the carcasses as possible otherwise the remaining sheep may chew the bones to obtain minerals. Not knowing whether the animal had died of a disease makes him wary of passing infection to the remaining animals. The same was true of him using poison to control foxes, they do not want to risk inadvertent poisoning of other animals or livestock.

The farmer was familiar with Griffon and Cinerous Vultures, and we assume from his description of birds taking lambs, Golden Eagle. Also, he sees Black Kite and hawk/falcon species in the area. He was not familiar with Lammergeier or Egyptian Vultures but did tell us about a potential nesting location used by Griffon Vultures and Saker Falcon which are to be monitored further during the 2022 survey period. At the time of the visit, we did not see any vulture or other large bird, but the cliff had many suitable caves and shelters, and they were largely whitewashed, suggesting the use by griffon vultures at least, see picture below. We did not check the bottom of the cliff for feathers or other remains.

The herder interviewed alongside the previous farmer held similar views although he expressed some more concerns for new-born lambs in the early part of their lives. He therefore stays with the flock all day during the lambing season.

A fourth shepherd had just arrived to the region to work the day before. He knew about vultures, and recognized the species (griffon and cinereous), spoke about a colony “80 km” away, he also knew the Sheiks and the falconry activity in the wide region, not in the project area.

In addition to the above, our interviews established that some burying takes place on site however in periods of very cold weather this is unlikely to be possible since the ground would be frozen solid.

Table 1: Dates, names, and correspondence with the farm number of the people interviewed

Date	Farmer	Farm	Herder	Notes
11-Dec-2021	Iskender	7	Vladimir	Interviewed
11-Dec-2021	Unknown name[1]	9	Unknown name	Interviewed
12-Dec-2021	Marat aga	5[2]	Unknown name	Interviewed
13-Dec-2021	Bakhriddin	6	----------	Farm visited
13-Dec-2021	Unknown name	2	Abdubakidjan	Interviewed

[1]”Unknown name” means we do not know their names by the time of writing this report.

[2]The farmer took us to the farm which is the area of Farmer 8 but currently used by Farmer 5.

During the site visit, we annotated the following:

- There is another farm in the eastern side of the project area which was excluded from the ESIA or any work related to the land plots. The nearest turbines are located 3,500-3,700 m to the east, but the red line of the project boundary is just 254 m away. From a vulture movement perspective, this farm should have to be included in the study. This farm joins plot #4. The

coordinates are 41T X:629730 and Y:4605883. Asking about why this farm was not included response was because they fixed a (social) limit when doing the assessment.

- Livestock management in the area comprises what is called extensive livestock rearing. The animals remain in the open field all the time except under severe weather conditions, e.g., snow falls. There is a daily activity of the shepherds who leave the corrals early in the morning with the herd, and accompanying dogs, the livestock moves around the plot, returning back to the corrals for overnight.
- We only saw cattle at one farm (#6) but the owner lives and works in Tashkent and we were unable to reach him on the phone.

- Sheep and goats are accompanied by the shepherds all the time, and they return to the corrals because of the water supply. There are no rivers where to drink, and every corral has a primitive pumping station, as they take water from wells.

- Horses remain free all the year round in small groups. They are left roaming in the pastureland with minimal control.

- Livestock could not be so accurately distributed as identified during previous land user interviews and documented in the in the Livestock Management Framework. One example seen during the site visit is area 4, which according to interviews is supposed not to have livestock but it does, near the limits with areas 3 (1,000m) and 10 (just joining the boundary). Not only sheep were seen but also horses within this area, see photos below. This may have implications in the collision risk, as this area is near a small roost where we found feathers of both griffon and cinereous vultures

Figure 1 Left: sheep with shepherd riding a horse in the boundaries between areas 4 (where I was) and area 10 (the livestock is). Right: last interview area 10, shepherd.

3. POTENTIAL LIVESTOCK MANAGEMENT OPTIONS

Following the meetings and discussions with herders, leaseholders and the Project/Lender teams, the following options were presented.

A) - *Blanket clearance of herders from site*

There does not appear to be a need to be grazing animals here (as in the lease holders and most herders work part time and returns on the time and effort of raising the livestock is relatively low when compared to wages available elsewhere in the city of Zarafshan). It is part of the local culture to raise livestock, but people typically do this due to a lack of alternative skills or options, or simply because it is what their family before them has done. Therefore, removal of herding activity from site would necessitate, at least, extensive alternative livelihood provision and training for herders/leaseholders. Experts from the Lenders panel believe that the areas will have sheep on it no matter what arrangements are in place, with a higher risk of this activity being unmanaged if not being done under formal land lease agreements.

It is considered that the blanket removal of livestock approach would also not have the desired impact of reducing collisions. Grazing animals are not the primary food source for sensitive bird species – except the griffon vulture- and accordingly removing/restricting grazing from site would have minimal effect on the attractiveness of the area. For Cinereous and Egyptian Vultures (and eagles/falcon species too), as according to local experts, livestock makes up only roughly 20% of the diet with the remaining 80% including native wild species present such as tortoises and smaller mammals. This local perception is supported by international experience of these vulture species' diets from Alvaro Camiña Cardenal (*in litt.* 2022). Removing non-native species would not reduce the presence of the majority of the birds' diet and this explains why the method would not reduce the collision impact by a detectable level. Removal of livestock grazing from the entire Project Area could even lead to an increased resource for small grazing species such as tortoises which in turn could increase the number of flightlines and therefore collision risk of species such as Egyptian Vulture. For Griffon Vultures, which rely on medium-large carcasses it is *likely* that removal of livestock would reduce collision risk to some degree (Alvaro Camiña Cardenal *in litt.* 2022). The opinion of the report authors is that this benefit would be outweighed by the social impacts and compensation due to leaseholders, especially when considered that other mitigation would need to be in place for all other species of concern.

B) – *Providing payment to herders/lease holders from Project for provision of carcasses / afterbirth to remove dead animals from site*

We found that not all livestock species have continued herder presence, with horses left to roam the landscape with no supervision, and sheep/goats left sometimes at night by the herder. Therefore, there is potential for animals, particularly larger ones, to die without the herder knowing about it for several days. This means that the method may not reduce the collision risk with an unknown – but potentially large – proportion of carcasses being found by species of concern prior to being found by herder.

In Spain compensation payments are given for livestock killed by wolves however this has led to false claims, with an estimated >20% of claims being fraudulent.

Overall, it is considered that paying for carcass removal is not the most cost-effective approach to minimise risk to birds in the area or the attractiveness of the site. Instead, the Project should work on a scheme that has the desired impact on collision risk whilst building on relationships with landowners.

From the two farmers interviewed one is retired, a second one works in the mine for several days, having then some days off. A third one lives in Tashkent and his livelihood depends from business other than livestock rearing. The benefit from livestock is related to extra incomes from which to finance different activities: a new house for the sons, to pay a wedding… but not to keep their livelihoods.

Figure 2 Cattle Farm #6, the largest one

C) – *Spend money on improving herder facilities.*

Based on evidence from the site visit, and in particular the large experience of Lenders' expert Alvaro Camiña, an option was developed that aims to ensure livestock are well cared for, loss of livestock from illness, bad weather or foxes/wild dogs is reduced, and a good relationship is built between the Project and local stakeholders during operation. With these actions and the associated improvements in welfare the mortality rates are likely to significantly improve which in turn reduces the Project Areas attractiveness for birds and minimises risk to birds in the area. The outline proposals will:

- Ensure that livestock are undercover at night and during harsh periods of weather (new corrals), see pictures below.

- Training to herders and livestock owners about seasonal risks to livestock / provide additional resources local herders can call on to help prevent avoidable increases in mortality

Each of the above to be agreed on individual basis as well as broad improvements which are also included in the Livelihood Restoration Plan:

- Educate herders and livestock about the legalities of poison use for pest control and the dangers of toxic substances being present within the landscape.
- The provision of building materials for livestock keeping such as barrier fence panels, gates, posts and wood – in-kind or in cash, in addition the Project will commit construction resources and personnel to help with the improvements to corrals and ad-hoc pens.
- Technical training on animal veterinary health (how to check for disease and potential treatment options, reproductive health, *etc*.).
- Provision of several Hissar sheep to improve the gene pool – in-kind or in cash
- Use Post Construction Fatality Monitoring (PCFM) and wind farm staff to monitor the livestock and pass the information on location and any dead animals or unusual vulture or carrion eating bird concentrations between survey shifts and arrange the appropriate measures if any carcasses are identified. An animal may die within the area under PCFM but also away from where the observers are.

- Use the provision of Project facilities and offices to try and get locals to provide information about dead animals which may need removal/burying. Build trust levels between the Project and local herders so that they are comfortable doing this without fear of repercussions from authorities for perceived neglect of their animals.
- To be adaptive throughout the duration of the project to allow any changes in livestock management on site or in the bird assemblages within the Project Area to be accommodated. Monitoring of the implementation of the above will be carried out semi-annually in the first three years reducing to yearly from year four of operation.

With the exception of farm #6, which has a good corral which has been recently improved, all the three of the farms we visited had poor care and quality. Shepherds leave the corral and return back. It would be good to know if this pattern occurs during the entire year, or if they are overnight somewhere else when hot temperatures in the region. We assume they return every day or after a few days (as one shepherd mentioned the livestock was thirsty after some days), as water is the limiting factor.

Carcasses available for vultures are unpredictable, at least in time. Spatially it is dependent on the daily activity of the herd (a shepherd/herder goes either walking, riding a horse or in a bike), the farmer uses a van of a car. Despite the responses we obtained during the interviews, burying a carcass is extremely difficult because of the terrain. The main objective is that they try to avoid a sheep/goat dying in the landscape as if they kill the animal after suffering an accident or becoming sick, it can then serve as food for the shepherds. We saw raw meat in one of the visits, at the shepherd corral (see photo), but also veterinarian medicines for livestock treatment. No firearms were seen during the inspection to one site, so it appears hunting is not common amongst farmers/herders.

The most likely situation if an animal dies whilst away from the corral is that they leave the carcass at the place it dies, as the last herder alluded to in our interview. It is unfeasible to transport the animal from the site to the corral, given the ways of locomotion noted above. However, if the animal becomes sick at the corral, or dies there, then they transport it to the *dacha* in the city.

3.1. Chosen Management Option

Option C as detailed above has been chosen as the most appropriate and feasible of the management options, it gives the chance to improve the situation for farmers and the Project alike. Onsite discussions with herders established that birds may find carcasses before they are noticed as being missing making

it impractical to offer payments for the herders to bring them to site. Lack of suitable transport and size of carcass are also likely to make Option B to implement effectively.

3.1.1. Feasibility of implementation

Consider effectiveness, resource/capacity and implications for any reduction in Collision Risk number

The proposed actions outlined above are cost effective, require minimal resources over those already committed and result in better livestock welfare and as a result reduce the base mortality rate. Sheep and goat farmers are usually those with lower incomes and are thus likely to welcome improved corrals that they can use. As such the plan is considered certainly feasible, though not comprehensive as some animals (notably horses) are hardy and will not be kept in corrals overnight. Further discussion will be completed in country to provide more detailed cost estimates related to improving the facilities available to those responsible for livestock. The overall proposals in turn would keep the collision risk to birds as low as it possible to do as the mortality rates of livestock are likely to improve with the interventions detailed above.

3.1.2. Potential economic impacts

Potential impacts of economic displacement (including any annual costs for compensation).

As discussed above the potential impacts of economic displacement are very unlikely as no removal of grazing from the landscape is proposed. There is a cultural link to the land here and the Project wishes to preserve and enhance this.

4. APPENDIX 1 - ZARAFSHAN WPP - QUESTIONS TO CLARIFY AND TO RAISE ON MISSION DECEMBER 2021

4.1. Key objectives

To inform the development of the livestock management framework by obtaining:

1. local input on the frequency, distribution and behavior of vultures and other scavenging raptors in and near to the project to provide context to baseline data.
2. a better understanding of the relationship between livestock presence and vulture flight activity
3. a better understanding of the scavenging activity of vultures within different livestock lease areas in and around the project site.
4. attitudes and responses of farmers/herders to livestock fatalities
5. information on farmers/herders dog feeding practices
6. a better understanding of seasonal patterns of livestock distribution/herding (in consultation with farmers/herders)
7. attitudes and responses of farmers/herders to vultures, concerns relating to herding livelihood, and response to, and livelihood impact of potential management measures (including excluding livestock from part or all of the Project Area.
8. a better understanding of the Project Area use patterns by other third party users and whether it has effect on the vulture activity.

4.2. Existing information on livestock numbers/distribution in lease areas and baseline vulture flight data

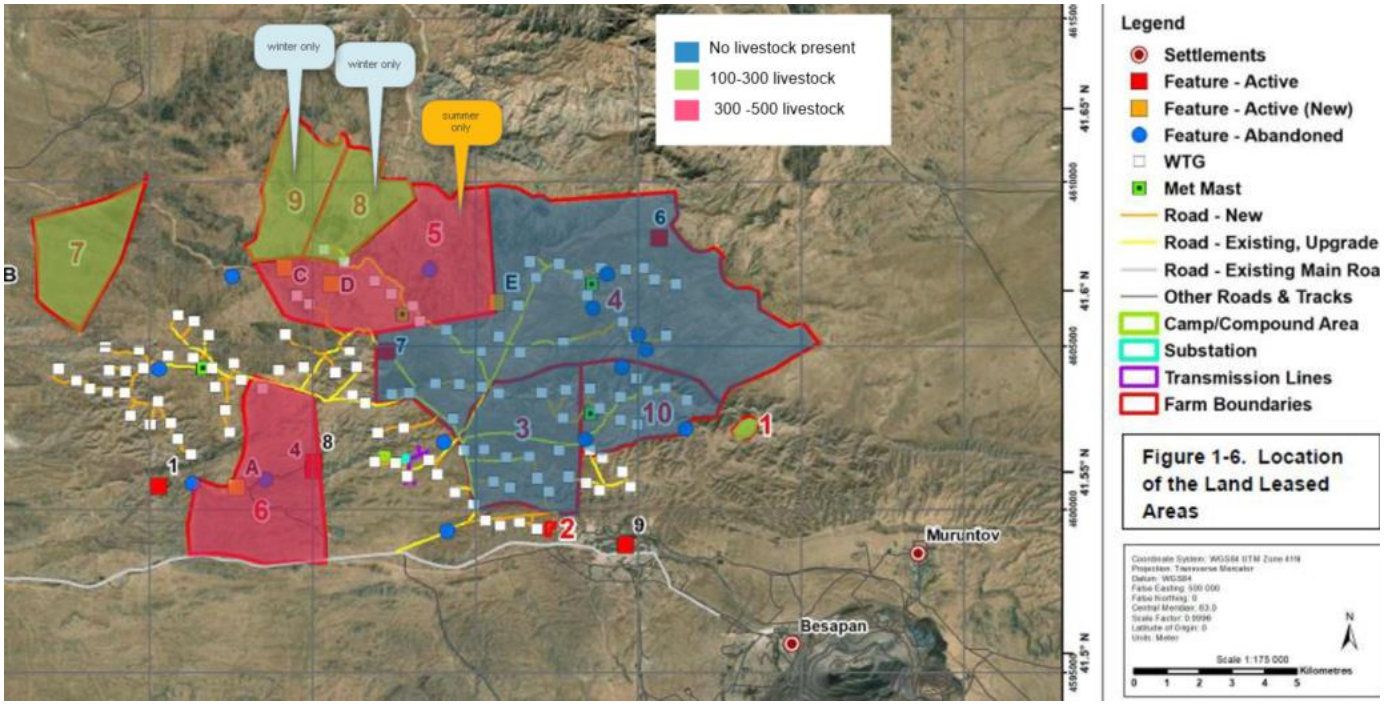
The Livestock Management Framework report supplied by Wood/Turnstone has information on livestock use and vulture activity but does not clearly highlight the following points which provide useful context for the livestock management aspect of the mission.

- 102 out of 111 (92%) of turbines are located in areas with no livestock grazing directly under turbines
- Of the remaining 9 turbines
    - 6 are in lease area 5 grazed by 450 sheep in summer only,
    - 2 are in lease area 8 grazed by 150 sheep in winter only, and

- 1 is in lease area 6 with a mix of sheep, goats and cattle and horses totaling just under 500 animals and grazed throughout the year (see map and table below).

- Baseline flight activity data does not appear to correspond well with areas where livestock are reported to occur. e.g. the spring vulture flight activity map (below) shows a relatively high flight activity in lease area 4 and 10 where there is apparently no livestock.

Lease areas showing livestock numbers (developed from information in the Turnstone report)



Livestock type and numbers (see map for location of lease numbers – colours to highlight low/high numbers in each column)

Lease Number	Herders	Sheep	Goats	Cattle	Horses	No. Seasons
1	2	200	0	0	0	4
2	1	350	0	0	0	4
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	1	450	0	0	0	1
6	1	200	100	150	40	4
7	1	250	20	0	0	4
8	1	150	0	0	0	1
9	0	100	110	0	0	1
10	0	0	0	0	0	0

Baseline vulture activity maps

Figure 3. Spring 2020 Vulture Movements

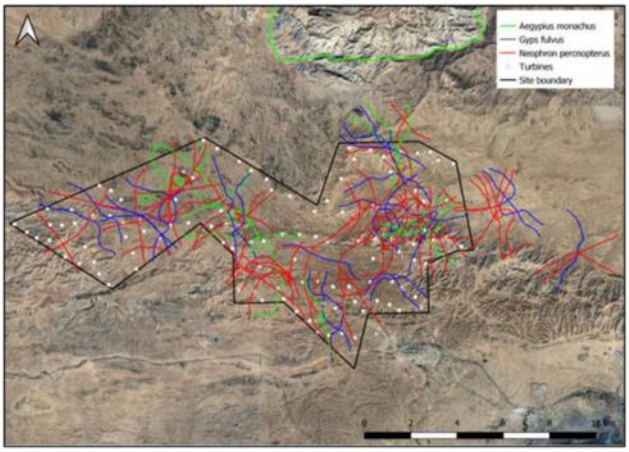


Figure 4. Summer 2020 Vulture Movements

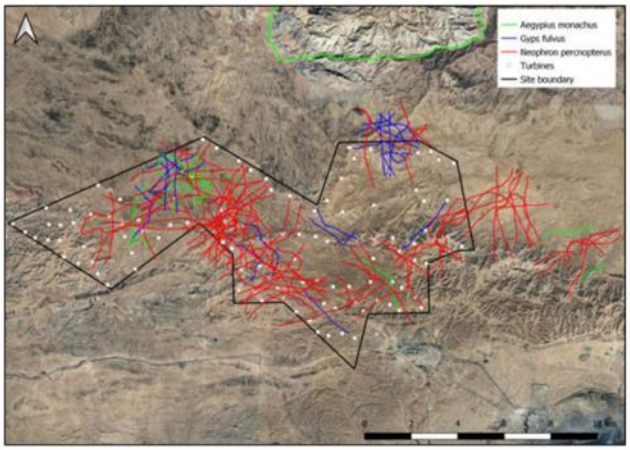
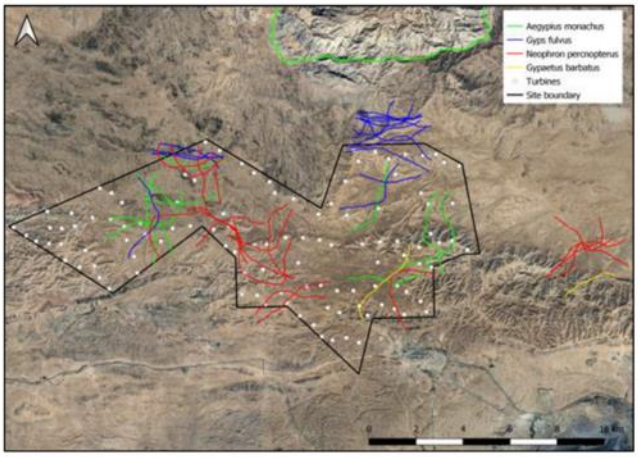


Figure 5. Autumn 2020 Vulture Movements



4.3. Questions to farmers/herders and others with local knowledge at project site

General questions relating to the farmers/herders interviewed

1. Are they the owner of the lease or contracted to look after the livestock?
2. Is herding in this area their main source of income? (Can herders provide an approximate % it comprises of their total income?). If not, what other activities provide the main source of income.
3. How long have they worked in the Project Area?
4. Do they manage the livestock full or part time?
5. How long do they typically spend on site with livestock each day?
6. How many people are there in a herders household (i.e. all the people living in the herders house)
7. Which of the herders has the widest knowledge of birds/vultures?

Vulture and other large raptor behaviour and their relationship with livestock

1. Which large birds of prey are seen flying most frequently in the Project Area? Show pictures first of vultures (as these are likely to be easier to identify) then eagle species (Steppe and Golden Eagle).
2. Where do each of the vulture species identified above breed/roost in the region? Are these on cliffs or in trees? How can we visit these sites? (show/explain map of area and ask respondents to point out breeding/roosting sites). [Also ask about any other large raptor breeding sites in and around the Project Area]
3. Where on site are vultures most frequently seen? (provide map and ask respondents to point out main areas).
4. What time of year are vultures most abundant in the Project Area?
5. Do vultures frequently visit any location away from the IBA and the project footprint? (provide map to allow respondents to point out any areas)
6. [Excluding mass livestock fatality events – see below] How frequently are vultures seen feeding at, or flying in the vicinity of, a livestock carcass? (regularly e.g. at nearly every carcass found/ infrequently e.g. 1 in every 10 carcasses / rarely – 1 carcass every 100).

7. Do vultures target other animals besides livestock within the site? Are there any other large mammals (antelopes, gazelle..) which the vultures could feed on?
8. When are the higher livestock mortality periods? [e.g. lambing is a critical time for vultures as they are breeding and need fresh food) as well as at the end of the dry season (usually end of summer) when pasture quality is lower and the animals may die due to lack of food]
9. Mass livestock fatality events are known to occur within and around the project site during unexpected poor weather. How many vultures are typically present each day in the wind farm area when a mass livestock fatality event occurs?
10. Can farmers/herders give a rough timeframe relating to how quickly vultures appear after 1) a single fatality occurs and 2) when a mass fatality event occurs?

Herding practices

11. How are livestock distributed across lease areas (e.g. always in a flock, across whole lease area, etc.)
12. Do herders normally stay with the herd all day?
13. When are the main lambing periods for sheep and goats?
14. Do herders put animals in an enclosure any time during the day? How do herders look after animals at night e.g. in an enclosure, outside but together in a flock, outside roaming freely)
15. Do these practices vary 1) through the year e.g. between summer and winter 2) between herders e.g. do herders who only use the area part of the year have different practices to those present all year?)
16. To what extent do livestock stray into other lease areas, or outside of lease areas? (especially those with no livestock use and a high number of turbines i.e. lease areas 3, 4 and10). If so why does this happen (e.g. better grazing)
17. Are herders permitted to make use of lease plots where there are no livestock grazing e.g. plots 3, 4 and 10, or of areas outside of lease plots?
18. Does grazing quality vary across the project site. If so, which areas have the best grazing land in winter, spring, summer and autumn? (provide map and ask respondents to point out best areas in each season).
19. Please point out where the livestock tend to access water and describe how/how often these water sources are used?

Livestock fatalities

20. What percentage/number of their flock do they expect to lose in a normal year?
21. Do herders have problems with wolves or other carnivores that predate their livestock?
22. Livestock fatalities are reported to be removed, burned, buried or left on the ground. Which of these practices is most commonly conducted by each herder? Note any others.
23. Are there any cultural, social, environmental reasons that effect how livestock fatalities are dealt with?
24. Have there been any significant changes to the climate or water availability in the last 3-5 years? How has this affected herding practices [e.g. mass livestock fatality events have become more frequent, lambing or herding pattern are changing, quality of some grazing areas becomes worse etc.]? Have you noticed any changes to the vulture/raptor behavior as a result?
25. With specific reference to mass livestock fatality events occurring within and around the project site.
    - Approximately how often do these events occur (e.g. every year/ every 5 years /every 10 years)
    - What is the scale of these events? (approximate number of livestock)?
    - What timescale do mass fatality events occur over? (e.g. do multiple carcasses appear within a week/over a month).
    - Are fatalities focused in a specific area/s or do they occur widely across the site?
26. Contracting a local waste disposal firm to rapidly remove fatalities from the site is proposed. Is this likely to be feasible before vultures detect carcasses and arrive at the project site?

Dog feeding practices

27. What food does each herder use to feed their dogs?
28. Where and when during the day are dogs fed?
29. Have any of the herders seen vultures or other large birds of prey in areas where dogs are fed? If so are vultures present at the feeding site before the dogs are fed?

Attitudes to vultures, livelihood and potential management measures

30. How do farmers/herders regard vultures?
31. What is each herder's motivation for herding (e.g. livelihood, cultural, status)?
32. What are each herder's concerns relating to herding? (e.g. loss of livestock, loss of lease areas, lack of good grazing – please note if several reasons are listed).
33. Which measures would herders suggest to reduce vulture activity in their lease areas?
34. What different management practices might each herder consider? (e.g. different types of carcass removal, night shelters/enclosures for livestock, moving of livestock from some areas of their lease areas during specific periods,)
35. How would farmers/herders rate the effectiveness of each of these measures?
36. Would any of those practices (in 33 and 34) have costs for each herder? If so, roughly how much?
37. Apart from costs, is there anything each herder would particularly like/dislike about these practices?
38. What is the attitude of the local population to developing supplemental feeding sites for vultures, (mindful that in many rural communities feeding birds (rather than people) may be unacceptable).

Role of households and communities

39. Do other family members of a herder's household participate in herding or livestock management? (describe their age and roles – surveyor to assess the level of involvement)
40. Do community members engage in other activities that may have impact an impact on vulture/raptor behavior, e.g. people herb gathering with dogs and staying in temporary shelters or tents overnight? How and which months is this most likely to take place?

5. APPENDIX 2 – MINUTES OF HERDER MEETINGS

MINUTES OF THE MEETING

Date: 11.12.2021

Meeting with:

- Farmer 7 (Name: Iskander) and his Herder (Name: Vladimir)
- Herder of Farmer 9 (briefly joint the meeting)

Attended by:

1. Alvaro Camina, IFC consultant
2. Simon Parker, Turnstone specialist
3. Tristan Evans, Turnstone speciliast
4. Saida Yusupova, GBI social specialist
5. Fazlullo Agzamov, GBI consultant

Meeting Place: shelter of Farmer 7

Purpose of the meeting: Collect data on Livestock Managment placticies from herders and farmers active in the area

Discussion Summary:

General questions relating to the farmers/herders interviewed

For herders of farmer 7 and 9 it's a full time job. The herder of farmer 7 lives alone, he is a pensioner. He stays all the time in the area and occasionally goes to Zarafshan. Herder of farmer 9 stays in the area and once a months visits his family in Zarafshan.

The farmer 7 once a week visits the area and provides food and other staff to the herder. Farmer 9 is more frequently comes to the farm and helps the herder.

Vulture and other large raptor behavior and their relationship with livestock

Herders and farmer were shown birds pictures. Herder of Farmer #7 could recognize cinereous vulture.

The herders could not point where the vultures are most frequently seen and responded that they fly over whole site. The herders responded that vultures are most active in spring, when sheep is lambing. The vultures are not seen frequently near the livestock carcass. The only case was last year mass livestock died because of acute cold on 13-20th March 2021. Respondents never observed vultures eating carcass of wild animal.

Farmer #7 noted the high mortality period for the herd is spring when sheep is lambing. Newly born lamb can lag behind the herd and be lost when the mom by the herd instinct can go with the herd. Lost alone lamb is easy victim for vultures. End of summer is not critical for the farmers on the site.

After mass fatality of livestock on 13-20th of March vultures started to come to carcasses only after freezing weather past. So on the 1st on April carcasses were still untouched.

Herding practices

Livestock always herd in a flock across the area. In lambing season (March and April) herders stay with the herd all day to protect newly born lamb, but in another period herder checks for flock once a day, give the water and track the route of the flock. Usually pens are used to count animals or catch animals. Also sheep with newly born lamb, weak and sick animals also sheep intended for cutting are kept in the pen.

Farmer and herders use one place for herding during the year. All farmers respect the borders of each other and try not to cross the borders. Occasionally, flock or sheep can cross the border only if it lost.

Quality of pasture depends on season and slops. In the spring everywhere pasture is well, but in mountainous areas grass grazing is available all year. The farmer has own water well. Usually water is given once a day.

Livestock fatalities

Farmer #7 said that last year he lost about 7% of the herd. There are no wolves in the area. Farmer #7 said the foxes sometimes stole newly born lambs. The farmer bury the carcass of animal as the carcass may spread the infection and other sheep may die. By Muslim culture also the carcass should be buried and if it's left it may distribute bad smell. The farmer noted that the last 2 years spring is dry, less precipitation and results in less herbs. The abnormal cold in March resulted in mass fatality. This is the second time such cold is observed. The first time was 10 years ago. But they didn't notice any change in the raptors/vultures behavior. Most of farmers on the site lost about 10 percent of livestock. He knows that mass fatality in March occurred in many part of Uzbekistan and Kazakhstan. Contracting waste disposal company can help to remove fatalities. Some challenges may occur if the carcass is in the mountainous area and its hard to find a carcass, vultures may find more quicker from the sky.

Dog feeding practices

The dogs are fed by leftover food of the herder. The dog is fed once a day, usually in the evening. The vultures were not observed near the dogs feeing place.

Attitudes to vultures, livelihood and potential management measures

Herders regard vultures as potential threat to newborn lambs which may lag behind the flock. This is the during lambing time the herder keeps the new born and moms in the pen. Also to protect newly born lamb from the vultures herders look for them all day during the lambing season. The herder of Farmer 7 started herding after he became a pensioner, he is happy with additional job as a herder as well as a place to stay. He is supplied with food by the farmer. The herders says that main concern is loss of livestock and lack of good grazing in the last years.

The herders try to remove the carcass of dead animal. Headers mentioned that sheep and goats gnaw the bones (if they need calcium) when they herd, and in case if they gnaw the bones of animal dead from infection or poison it may be fatal for them.

To minimalize the risk of killing the lamb by foxes, they put poisoned liver/meat around the farm. But by the words of farmer this method is not working on vultures, they barf out poisoned meat at once. Poisoning foxes may cost some amount. But farmer didn`t share where he gets a poison and its price.

Local farmers/herders would not mind if someone would feed the vultures in lambing season. As an option for the feeding site for vultures is mountains in the North (Tamdi Aktau)

Role of households and communities

Herders's family members do not participate in the herding. In spring months some local people come for picnic to Aktau mountains.

MINUTES OF THE MEETING

Date: 12.12.2021

Meeting with:

- Farmer 5 (Name: Marataga)
- Herder of Farmer 5 (The farmer took us to the farm with a shelter and a pan, which is the area of Farmer 8 but currently used by Farmer 5)

Attended by:

1. Alvaro Camina, IFC consultant
2. Simon Parker, Turnstone
3. Tristan Evans, Turnstone
4. Saida Yusupova, GBI social specialist
5. Fazlullo Agzamov, GBI consultant

Meeting Place: The interview with farmer took place at the farmer's place (dacha). After the meeting the farmer took us to the rock when the vulture breed and than to his farm where we met with hi herder.

Purpose of the meeting: Collect data on Livestock Managment placticies from active herders and farmers in the area

Discussion Summary:

General questions relating to the farmers/herders interviewed

The farmer 5 is a pensioner and the farm generates additional income to the family. The farmer is unofficial leader of the area. He is the farmer since soviet (kholhoz) times and possesses the widest knowledge of the birds and local are. For herder of Farmer 5 it's a full time job. The farmer pays 3 thousand soum per month. The herder is from Tamdy, he stays in the shelter and once a month leave to see the family. The herder joint the farmer about 3-4 months ago.

Vulture and other large raptor behavior and their relationship with livestock

Farmer 5 recognized cinereous vulture and griffon vulture. The Farmer took us to the rock where vultures are breeding. The herders responded that vultures are most active in spring, when sheep is lambing. The vultures are not seen frequently near livestock carcass. The only case was last year when mass livestock died because of acute cold on 13-20th March 2021. Respondents never observed vultures eating carcass of wild animal.

Herding practices

Livestock is always herd in a flock across the area. In lambing season (in March and April) herders stay with a herd all day to protect newly born lamb, but in another period herder checks for flock once a day, give the water and track the route of the flock.

Farmer and herders use one place for herding during the year. All farmers respect the borders of each other and try not to cross the borders. Occasionally, flock or sheep can cross the border only if it is lost.

The farmer has own water well. Usually water is given once a day. The farmer shared that to keep the sheep healthy it's important to feed them well with herbs in spring and regularly give water in summer. Otherwise local breed is resistant to cold and do not have any deceases.

Livestock fatalities

The farmer shared that he provides mortality rate as 3% to the statistics authority as it is recommended number but in reality he has lower rate. The period when farmer and herder always stay in tern with the herd is lambing period. Left alone new born lamb is easy victim for vultures. But if the human is in the area the vultures do not attack the new born lambs. End of summer is not critical for the farmers on the site.

There are no wolves in the area. Farmer #5 shared that sometimes flock of wild dogs may come and attack the herd. The farmer said that it's a must to burn and bury the carcass of the animal. The carcass may spread the infection and decease. The farmer noted that last 2 years spring had low precipitation and resulted in less herbs. The abnormal cold in March resulted in mass fatality. This is the second time such cold is observed. The first time it was 10 years ago. But they didn't notice any change in the raptors/vultures behavior. Most of farmers on the site lost not more then10 percent of the livestock. Contracting waste disposal company can help to remove fatalities.

Dog feeding practices

The farmer does not have a dog. He says there is no need for dogs for an experienced farmer.

Attitudes to vultures, livelihood and potential management measures

Herder regard vultures as potential threat to new born lambs which may lag behind the flock. This is the during lambing time the herder keeps the new born and moms in the pen. Also to protect newly born lamb from the vultures herders look for them all day during the lambing season.

The herder says that main concern to them is loss of livestock and lack of good grazing the last years.

The herder says that he buries the carcass of the dead animal. Header mentioned that sheep and goats gnaw the bones (if they need calcium) when they herd, and in case if they gnaw the bones of animal dead from infection or poison it may be fatal for them.

The farmer as the informal leader of the area and he is against the animals' poisoning practice, as well as he shared that if he sees a hunter in the area he will immediately inform ecological police and since the local hunters know about this, they never show up in his area. The Farmer says the best measure to protect new born lambs is just be attentive during the lambing season.

Local farmers/herders would not mind if feeding of the vultures will be arranged in lambing season.

Role of households and communities

Herder's family members do not participate in the herding. Farmer's son (he works in the mining) helps his farther during the days off.

MINUTES OF THE MEETING

Date: 13.12.2021

Meeting with:

- Farmer 6 (Farmer's name: Bakhriddin. We were not able to reach him on the phone, thus drove by his area. The dogs started barking at us. The herder was in the area. But since the farmer was not in the area we didn't stop in the place.)
- Herder of Farmer 2 (Herder's name is Abdubakidjan, he is new and started working in the farm a day before we met him). His area is in the north east of the site. Since the herder is new to the farm the interview was brief.

Attended by:

1. Alvaro Camina, IFC consultant
2. Simon Parker, Turnstone
3. Tristan Evans, Turnstone
4. Saida Yusupova, GBI social specialist
5. Fazlullo Agzamov, GBI consultant

Meeting Place: Area of the Farmer 2 (near the container and a pen)

Purpose of the meeting: Collect data on Livestock Managment placticies from active herders and farmers in the area

Discussion Summary:

General questions relating to the farmers/herders interviewed

For the herder of Farmer 2 this is a full time job. He is young, not married. He stays with his parent in Tamdy. He stays in the shelter and once a month leaves to see the family. The herder joint the farm the day before. Before joining the farm he was herding in the another farm in the north from the project site.

Vulture and other large raptor behavior and their relationship with livestock

The herder recognized cinereous vulture and griffon vulture. The herder responded that vultures are most active in spring, when sheep is lambing. The vultures are not seen frequently in the visit of a livestock carcass.

Herding practices

The farmer 2 (Abdubakitjan) practice separating summer and winter places for herding.

The farmer has own water well. Usually water is given once a day.

Livestock fatalities

There are no wolves in the area. The herder said that they try to bury the carcasses, however there were cases when carcasses were left. The acute cold last year resulted in mass fatal cases. The farmer lost a big number of sheep.

Dog feeding practices

The herder does not have dog in the place. He says there is no need for dogs.

Attitudes to vultures, livelihood and potential management measures

The herder regards vultures as potential threat to new born lambs which may lag behind the flock. This is the during lambing time the herder keeps the new born and moms in the pen . Also to protect newly born lamb from the vultures herders look for them all day during the lambing season.

The herder says that main concern to them is loss of livestock and lack of good grazing the last years.

The herder says that they remove the carcass of dead animal. The herders would not mind if feeding of the vultures will be arranged in lambing season.

Role of households and communities

Herders's family members do not participate in the herding.

Minutes taken by: Saida Yusupova, GBI Consulting